Biotechnology and Bioengineering

Volume 58, 1998

Volume 58, Number 1, April 5, 1998

Continuous Culture Dynamics for Aniline Metabolism by *Pseudomonas* sp. CIT1
S.M. Thomas and S.W. Peretti

13 Expert System for Control of Anaerobic Digesters
P.C. Pullammanappallil, S.A. Svoronos, D.P. Chynoweth, and G. Lyberatos

23 Removal of Proteoglycans Increases Efficiency of Retroviral Gene Transfer
J.M. Le Doux, J.R. Morgan, and M.L. Yarmush

35 Examination of Protein Adsorption in Fluidized Bed and Packed Bed Columns at Different Temperatures Using Frontal Chromatographic Methods
G.M.S. Finette, Q.-M. Mao, and M.T.W. Hearn

47 Yeast Suspension Filtration: Flux Enhancement Using an Upward Gas/Liquid Slug Flow—Application to Continuous Alcoholic Fermentation with Cell Recycle
M. Mercier, C. Maranges, C. Fonade, and C. Lafforgue-Delorme

58 Affinity Extraction of Proteins with a Reversed Micellar System Composed of Cibacron Blue-Modified Lecithin
Y. Sun, S. Ichikawa, S. Sugiura, and S. Furusaki

65 Establishment of an Apoptosis-Resistant and Growth-Controllable Cell Line by Transfecting with Inducible Antisense c-*Jun* Gene
Y.H. Kim, T. Iida, T. Fujita, S. Terada, A. Kitayama, H. Ueda, E.V. Prochownik, and E. Suzuki

73 Characterization of Chimeric Antibody Producing CHO Cells in the Course of Dihydrofolate Reductase-Mediated Gene Amplification and Their Stability in the Absence of Selective Pressure
S.J. Kim, N.S. Kim, C.J. Ryu, H.J. Hong, and G.M. Lee

85 Enhanced TGFβ1 Maturation in High Five Cells Coinfected with Recombinant Baculorvirus Encoding the Convertase Furin/Pace: Improved Technology for the Production of Recombinant Proproteins in Insect Cells
M.-H. Laprise, F. Grondin, and C.M. Dubois

92 Growth Characteristics of *Escherichia coli* HB101[pGEc47] on Defined Medium
S.A. Rothen, M. Sauer, B. Sonnleitner, and B. Witholt

101 Mathematical Modeling of Biofilm Structure with a Hybrid Differential-Discrete Cellular Automaton Approach
C. Picioreanu, M.C.M. van Loosdrecht, and J.J. Heijnen

117 Erratum

118 Forthcoming Articles

Volume 58, Numbers 2 & 3, April 20/May 5, 1998

SPECIAL ISSUE ON METABOLIC ENGINEERING
Gregory Stephanopoulos, Editor

EDITORIAL

119 Metabolic Engineering
G. Stephanopoulos

ARTICLES

121 Increasing the Flux in Metabolic Pathways: A Metabolic Control Analysis Perspective
D.A. Fell

125 Metabolic Engineering: Techniques for Analysis of Targets for Genetic Manipulations
J. Nielsen

133 A Structured Approach for Selection Among Candidate Metabolic Network Models and Estimation of Unknown Stoichiometric Coefficients
P.A. Vanrolleghem and J.J. Heijnen

139 On-Line Metabolic Pathway Analysis Based on Metabolic Signal Flow Diagram
H. Shi and K. Shimizu

149 Experimental Determination of Group Flux Control Coefficients in Metabolic Networks
T.W. Simpson, H. Shimizu, and G. Stephanopoulos

154 Application of Mathematical Tools for Metabolic Design of Microbial Ethanol Production
V. Hatzimanikatis, M. Emmerling, U. Sauer, and J.E. Bailey

162 How Will Bioinformatics Influence Metabolic Engineering?
J.S. Edwards and B.O. Palsson

170 Multiple Mechanisms Controlling Carbon Metabolism in Bacteria
M.H. Saier, Jr.

175 Engineering Protein-Based Machines to Emulate Key Steps of Metabolism (Biological Energy Conversion)
D.W. Urry, S.Q. Peng, L.C. Hayes, D. McPherson, J. Xu, T.C. Woods, D.C. Gowda, and A. Pattanaik

191 Artificial Promoters for Metabolic Optimization
P.R. Jensen and K. Hammer

196 Overexpression of a Cytosolic Chaperone to Improve Solubility and Secretion of a Recombinant IgG Protein in Insect Cells
E. Ailor and M.J. Betenbaugh

204 Metabolic Engineering of Bacteria for Ethanol Production
L.O. Ingram, P.F. Gomez, X. Lai, M. Moniruzzaman, B.E. Wood, L.P. Yomano, and S.W. York

215 Genetic Manipulation of Acid and Solvent Formation in *Clostridium acetobutylicum* ATCC 824
E.M. Green and G.N. Bennett

222 Metabolic Effects of Stress Mediators on Cultured Hepatocytes
C.A. Zupke, P. Stefanovich, F. Berthiaume, and M.L. Yarmush

231 Engineering Polyphosphate Metabolism in *Escherichia coli*: Implications for Bioremediation of Inorganic Contaminants
J.D. Keasling, S.J. Van Dien, and J. Pramanik

240 Rational Engineering of the TOL *meta*-Cleavage Pathway
R. Sheridan, G.A. Jackson, L. Regan, J. Ward, and P. Dunnill

COMMUNICATIONS TO THE EDITOR

250 In vivo ^{13}C-NMR Studies of Polymer Synthesis in *Rhizobium meliloti* M5N1 Strain
P. Tavernier, I. Besson, J.-C. Portais, J. Courtois, B. Courtois, and J.-N. Barbotin

254 ^{13}C Tracer Experiments and Metabolite Balancing for Metabolic Flux Analysis: Comparing Two Approaches
K. Schmidt, A. Marx, A.A. de Graaf, W. Wiechert, H. Sahm, J. Nielsen, and J. Villadsen

258 Metabolite-Balancing Techniques Vs. ^{13}C Tracer Experiments to Determine Metabolic Fluxes in Hybridoma Cells
H.P.J. Bonarius, B. Timmerarends, C.D. de Gooijer, and J. Tramper

263 A Simple Structured Model Describing the Growth of *Streptomyces lividans*
E.B. Daae and A.P. Ison

267 Redesigning Metabolic Networks Using Mathematical Programming
J.P. Dean and G.A. Dervakos

272 Cell Cycle Dependence of Retroviral Transduction: An Issue of Overlapping Time Scales
S. Andreadis, A.O. Fuller, and B.O. Palsson

282 Application of Cybernetic Models to Metabolic Engineering: Investigation of Storage Pathways
J. Varner and D. Ramkrishna

292 Stimulation of Glucose Catabolism Through the Pentose Pathway by the Absence of the Two Pyruvate Kinase Isoenzymes in *Escherichia coli*
E. Ponce, A. Martínez, F. Bolívar, and F. Valle

296 Rational Design of an Improved Induction Scheme for Recombinant *Escherichia coli*
D. Mattanovich, W. Kramer, C. Lüttich, R. Weik, K. Bayer, and H. Katinger

299 An Experimental Study on Carbon Flow in *Escherichia coli* as a Function of Kinetic Properties and Expression Levels of the Enzyme Phosphoglucomutase
T. Brautaset, S. Petersen, and S. Valla

303 Uncoupled Glycerol Distribution as the Origin of the Accumulation of 3-Hydroxypropionaldehyde During the Fermentation of Glycerol by *Enterobacter agglomerans* CNCM 1210
F. Barbirato, P. Soucaille, C. Camarasa, and A. Bories

306 Production of Lycopene by the Food Yeast, *Candida utilis* That Does Not Naturally Synthesize Carotenoid
Y. Miura, K. Kondo, H. Shimada, T. Saito, K. Nakamura, and N. Misawa

309 Direct Fermentation of 2-Keto-L-Gulonic Acid in Recombinant *Gluconobacter oxydans*
Y. Saito, Y. Ishii, H. Hayashi, K. Yoshikawa, Y. Noguchi, S. Yoshida, S. Soeda, and M. Yoshida

316 Allocation of ATP to Synthesis of Cells and Hydrolytic Enzymes in Cellulolytic Fermentative Microorganisms: Bioenergetics, Kinetics, and Bioprocessing
G.P. van Walsum and L.R. Lynd

321 Yeast Cell Permeabilizing β-1,3-Glucanases: A Tool for the Integration of Downstream Processes and Metabolic Engineering Applications to Yeast
P. Ferrer, I. Diers, J.A. Asenjo, and B.A. Andrews

325 High Cell Density Culture of Metabolically Engineered *Escherichia coli* for the Production of Poly(3-hydroxybutyrate) in a Defined Medium
F. Wang and S.Y. Lee

329 Metabolic Engineering of Cultured Tobacco Cells
A. Shinmyo, T. Shoji, E. Bando, S. Nagaya, Y. Nakai, K. Kato, M. Sekine, and K. Yoshida

333 Quantification of Metabolites in the Indole Alkaloid Pathways of *Catharanthus roseus*: Implications for Metabolic Engineering
J.V. Shanks, R. Bhadra, J. Morgan, S. Rijhwani, and S. Vani

339 Production of L-DOPA(3,4-Dihydroxyphenyl-L-alanine) from Benzene by Using a Hybrid Pathway
H.-S. Park, J.-Y. Lee, and H.-S. Kim

344 Forthcoming Articles

Volume 58, Number 4, May 20, 1998

345 Cyclodextrin Effects on the *ex-Situ* Bioremediation of a Chronically Polychlorobiphenyl-Contaminated Soil
F. Fava, D. Di Gioia, and L. Marchetti

356 Biotransformation of Octane by *E. coli* HB101[pGEc47] on Defined Medium: Octanoate Production and Product Inhibition
S.A. Rothen, M. Sauer, B. Sonnleitner, and B. Witholt

366 Chemically Stabilized Trypsin Used in Dipeptide Synthesis
A. Murphy and C.Ó Fágáin

374 Sucrose Enhances the Recovery and Activity of Ribonuclease A During Reversed Micelle Extraction
G. Spirovska and J.B. Chaudhuri

380 Deactivation and Conformational Changes of Cutinase in Reverse Micelles
E.P. Melo, C.M.L. Carvalho, M.R. Aires-Barros, S.M.B. Costa, and J.M.S. Cabral

387 Transition Probability Cell Cycle Model with Product Formation
S.J. Cain and P.C. Chau

400 Influence of Biomass Production and Detachment Forces on Biofilm Structures in a Biofilm Airlift Suspension Reactor
W.K. Kwok, C. Picioreanu, S.L. Ong, M.C.M. van Loosdrecht, W.J. Ng, and J.J. Heijnen

408 Denitrification and Nitric Oxide Reduction in an Aerobic Toluene-Treating Biofilter
C.A. du Plessis, K.A. Kinney, E.D. Schroeder, D.P.Y. Chang, and K.M. Scow

416 Protein Sorption and Recovery by Hydrogels Using Principles of Aqueous Two-Phase Extraction
S.H. Gehrke, N.R. Vaid, and J.F. McBride

428 Systematic Errors in Data Evaluation Due to Ethanol Stripping and Water Vaporization
P. Duboc and U. von Stockar

440 Increase of Xylitol Production Rate by Controlling Redox Potential in *Candida parapsilosis*
D.-K. Oh, S.-Y. Kim, and J.-H. Kim

445 On-Line Estimation of Biomass Through pH Control Analysis in Aerobic Yeast Fermentation Systems
A. Vicente, J.I. Castrillo, J.A. Teixeira, and U. Ugalde

451 Erratum

452 Forthcoming Articles

Volume 58, Number 5, June 5, 1998

RAPID COMMUNICATION

554 Directed Evolution of an Esterase for the Stereoselective Resolution of a Key Intermediate in the Synthesis of Epothilones
U.T. Bornscheuer, J. Altenbuchner, and H. Meyer

ARTICLES

453 Reactor Heterogeneity with *Saccharopolyspora erythraea* Airlift Fermentations
D.J. Pollard, A.P. Ison, P.A. Shamlou, and M.D. Lilly

464 Specific Heat Flow Rate: An On-Line Monitor and Potential Control Variable of Specific Metabolic Rate in Animal Cell Culture that Combines Microcalorimetry with Dielectric Spectroscopy
Y. Guan, P.M. Evans, and R.B. Kemp

478 Intrinsic Kinetic Parameters of the Pellet Forming Fungus *Aspergillus awamori*
L. Hellendoorn, H. Mulder, J.C. van den Heuvel, and S.P.P. Ottengraf

486 A Single Step Purification, Immobilization, and Hyperactivation of Lipases via Interfacial Adsorption on Strongly Hydrophobic Supports
A. Bastida, P. Sabuquillo, P. Armisen, R. Fernández-Lafuente, J. Huguet, and J.M. Guisán

494 Factorial Optimization of a Six-Cellulase Mixture
E. Kim, D.C. Irwin, L.P. Walker, and D.B. Wilson

502 Genetically Structured Mathematical Modeling of *trp* Attenuator Mechanism
B.T. Koh, R.B.H. Tan, and M.G.S. Yap

510 Removal of Nitrate from Industrial Wastewaters in a Pilot Plant by Nitrate-Tolerant *Klebsiella oxytoca* CECT 4460 and *Arthrobacter globiformis* CECT 4500
G. Piñar, J.-M. Oliva, L. Sánchez-Barbero, V. Calvo, and J.L. Ramos

515 Analysis of Cell Cycle Activity and Population Dynamics in Heterogeneous Plant Cell Suspensions Using Flow Cytometry
W. Yanpaisan, N.J.C. King, and P.M. Doran

529 A Novel Biotinylated Degradable Polymer for Cell-Interactive Applications
S.M. Cannizzaro, R.F. Padera, R. Langer, R.A. Rogers, F.E. Black, M.C. Davies, S.J.B. Tendler, and K.M. Shakesheff

536 Optimized Release of Recombinant Proteins by Ultrasonication of *E. coli* Cells
J.X. Feliu, R. Cubarsi, and A. Villaverde

541 On-Line Study of Fungal Morphology During Submerged Growth in a Small Flow-Through Cell
A. Spohr, C. Dam-Mikkelsen, M. Carlsen, J. Nielsen, and J. Villadsen

560 Forthcoming Articles

Volume 58, Number 6, June 20, 1998

561 Metabolism Analysis and On-Line Physiological State Diagnosis of Acetone–Butanol Fermentation
S. Chauvatcharin, C. Siripatana, T. Seki, M. Takagi, and T. Yoshida

572 Solubilization of Subtilisin in CO_2 Using Fluoroether-Functional Amphiphiles
E.G. Ghenciu, A.J. Russell, E.J. Beckman, L. Steele, and N.T. Becker

581 Microporous Microparticles Designed as Stable Immunoadsorbents
N. Ubrich, C. Rivat, C. Vigneron, and P. Maincent

587 A Membrane Bioreactor for Biotransformations of Hydrophobic Molecules
S.D. Doig, A.T. Boam, D.I. Leak, A.G. Livingston, and D.C. Stuckey

595 The Effects of Turbulent Jet Flows on Plant Cell Suspension Cultures
P.F. MacLoughlin, D.M. Malone, J.T. Murtagh, and P.M. Kieran

605 Modeling of Biomass Productivity in Tubular Photobioreactors for Microalgal Cultures: Effects of Dilution Rate, Tube Diameter, and Solar Irradiance
F.G. Acién Fernández, F. García Camacho, J.A. Sánchez Pérez, J.M. Fernández Sevilla, and E. Molina Grima

617 Biooxidation Capacity of the Extremely Thermoacidophilic Archaeon *metallosphaera sedula* Under Bioenergetic Challenge
C.J. Han and R.M. Kelly

625 Plasmid Maintenance in *Escherichia coli* Recombinant Cultures is Dramatically, Steadily, and Specifically Influenced by Features of the Encoded Proteins
J.L. Corchero and A. Villaverde

633 Characterization of Gas Transfer and Mixing in a Bubble Column Equipped with a Rubber Membrane Diffuser
B.R. Poulsen and J.J.L. Iversen

642 Improvement of Interferon-γ Sialylation in Chinese Hamster Ovary Cell Culture by Feeding of *N*-Acetylmannosamine
X. Gu and D.I.C. Wang

649 Selective Separation of Trypsin from Pancreatin Using Bioaffinity in Reverse Micellar System Composed of a Nonionic Surfactant
M. Adachi, K. Shibata, A. Shioi, M. Harada, and S. Katoh

COMMUNICATIONS TO THE EDITOR

654 Testing for Diffusion Limitations in Salt-Activated Enzyme Catalysts Operating in Organic Solvents
B.A. Bedell, V.V. Mozhaev, D.S. Clark, and J.S. Dordick

658 Activity Losses Among T4 Lysozyme Variants After Adsorption to Colloidal Silica
C.K. Bower, Q. Xu, and J. McGuire

663 Effect of Yeast Extract Supplementation in Leach Solution on Bioleaching Rate of Pyrite by Acidophilic Thermophile *Acidianus brierleyi*
Y. Konishi, S. Yoshida, and S. Asai

668 Forthcoming Articles

669 Indexes to Volume 58